

ARMAR OBSERVATIONS DURING TOGA/COARE

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The NASA/JPL Airborne Rain Mapping Radar (ARMA R) was deployed during TOGA/COARE on the NASA Ames DC-8 aircraft. ARMAR is a 14 GHz, downward-looking radar designed to simulate the TRMM radar frequency and geometry. It can acquire data in a variety of modes, including Doppler and dual-polarization. In most modes the 14 GHz brightness temperature is also acquired. A total of 13 flights over the Western Pacific Ocean were made during January and February 1993. The systems observed included isolated convective cells, mesoscale convective complexes, and a tropical cyclone. The majority of data were acquired in the single polarization, Doppler mode, allowing measurement of reflectivity, mean velocity and velocity spectrum width. Dual-polarization data (HH-HV and HH-VV) were also acquired.

Because the 14 GHz frequency is attenuated by rainfall, attenuation must be taken into account when estimating rainrate. We show several cases comparing different techniques for doing this: surface reference, mirror image, and radar/radiometer. Profiles of rainrate, which are an indicator of the latent heating profile, are then presented. Next, we discuss the use of dual-polarization in identifying ice and mixed phased regions. Typical features of the different rain producing systems observed by ARMAR are presented, including presence or absence of mixed phase regions, presence or absence of a well-defined melting layer, and velocity structure.

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